

thus be analysed into well-defined radiations widely different in penetrating power, and may be said to give a line spectrum in X-rays. The absorbability of the fluorescent radiations is given by the following values of λ/ρ , where λ is the coefficient of absorption of these radiations in aluminium of density ρ :—

Ag radiator: (Series K) [2.5]; (Series L) 700	
Sb " " " 1.21 " 435	
I " " " 0.92 " 300	
Ba " " " 0.8 " 224	

PARIS.

Academy of Sciences, October 30.—M. Armand Gautier in the chair.—**B. Baillaud**: Presentation of two volumes of the "Annales de l'Observatoire de Paris."—**Ch. André**: The formation of suns. Referring to recent adverse criticisms of Laplace's theory, the author maintains that recent physical researches confirm this theory.—**A. Demoulin**: The R surfaces.—**Eugenio Elia Levi**: Periodic differential equations.—**Paul Dienes**: The summation of Taylor's series.—**Henry Hubert**: The parabolic form of the exposed acid crystalline rocks in western Africa. The water erosion takes place only at the expense of granitic rocks, and is characteristic of certain regions. The effect of the motion of the cutting particles is shown to result in a curved outline.—**G. Millochau**: Contribution to the study of the spectral effects of electric discharges in gases and vapours. The image from a vacuum tube containing the gas under examination at a known pressure is projected on to a circular photographic film rotating at a high known velocity. Seven kinds of simple discharge are described, and three types of mixed discharge. All the results are in accord with hypotheses which connect the production of the spectrum with the temperature of the molecule and the dissociation effects corresponding with that temperature.—**Albert Colson**: The theory of solutions and heats of solution. The author regards the identification of the dissolved particle with the chemical molecule as inadmissible, and considers that the dissolved particle is generally polymolecular. He suggests *dissolecule* as a distinctive name for the dissolved particle. The difference between the heat of solution of a gas and its heat of condensation, which should be zero according to the van 't Hoff hypothesis, represents the heat disengaged by the molecular contraction giving rise to the dissolecule.—**MM. Broniewski and Hackepill**: The electrical properties of the alkali metals, of rhodium, and of iridium. Measurements are given of the thermoelectric power of caesium, rubidium, potassium and sodium, and of rhodium and iridium. The purification of the alkali metals was effected by distillation in a vacuum.—**G. D. Hinrichs**: The atomic weights of the dominant elements.—**E. Chablay**: The use of liquid ammonia in chemical reactions. Researches on the alcoholates. An alcohol dissolved in liquid ammonia immediately decolorises a blue solution of potassiumammonium or sodammonium, hydrogen, ammonia, and the anhydrous alcoholate RONa being formed. A blue solution of calcium-ammonium reacts similarly, the calcium alcoholate being formed. Barium and strontium ammoniums act similarly.—**Maurice Lanfry**: The oxy- β -methylthiophenes.—**MM. Taffanel and Dautriche**: The mode of firing explosives. In blasting in mines one cartridge containing fulminate is usually arranged to explode several cartridges containing safety explosive only. Experiments are described showing the most advantageous arrangement of the fulminating cartridge with respect to the others.—**Jean Friedel**: The effect on vegetation of a more complete darkness than that currently employed in laboratories. A box for growing plants in the dark is described in which the exclusion of light is so perfect that a delicate photographic paper is unaffected after prolonged exposure. The results on the plants are compared with those obtaining under ordinary conditions, in which the exclusion of light is not so perfect.—**Pierre Berthault**: The variations of tuberiferous *Solanum*.—**P. Desroche**: The action of various light radiations on the motion of the zoospores of *Chlamydomonas*.—**A. Marie and A. Donnadiu**: Leucogenesis and intestinal epithelium.—**A. Magnan**: Human monsters.—**Pierre Georgevitch**: The formation and germination of the spores of *Bacillus thermophilus vragensis*.—**Louis Gentil**: The country of

Zaër, western Morocco.—**Maurice Lugeon**: The existence of two phases of Palaeozoic foldings in the western Alps.—**Carl Renz**: The extension of the Palaeozoic formations in the islands off the coast of Argos.—**Fernand Meunier**: The Blattidæ of the Commeny Coal-measures. The lake of Commeny would appear to have been inhabited by a fauna of Blattidæ, less rich than in the American deposits, and represented by a very small number of genera, some of which possessed extremely prolific species.—**Ch. Moureu and A. Lepape**: The rare gases in fire-damp. Analyses of five specimens of fire-damp collected under conditions excluding air. One striking fact brought out by these analyses is the much higher proportion of helium to nitrogen than that existing in air. The nitrogen from the Mons specimen contained no less than 13 per cent. of helium.

BOOKS RECEIVED.

Die Palaeobotanische Literatur. Bibliographische Übersicht über die Arbeiten aus dem Gebiete der Palaeobotanik. Herausgegeben von W. J. Jongmans. Zweiter Band. Pp. iv+417. (Jena: Fischer.) 18 marks.

Die Bearbeitung des Glases auf dem Blasetische. By D. Djakonow and W. Lermantoff. Zweite Auflage. Pp. xv+196. (Berlin: R. Friedländer & Sohn.) 6 marks.

A Naturalist on Desert Islands. By P. R. Lowe. Pp. xii+300. (Witherby and Co.) 7s. 6d. net.

Psychology and Pedagogy of Writing: a Résumé of the Researches and Experiments bearing on the History and Pedagogy of Writing. By Dr. M. E. Thompson. Pp. 128. (Baltimore: Warwick and York Inc.)

Mental Fatigue: a Comprehensive Exposition of the Nature of Mental Fatigue, of the Methods of its Measurement and of their Results, with Special Reference to the Problems of Instruction. By Prof. Max Offner. Translated by Prof. G. M. Whipple. Pp. viii+133. (Baltimore: Warwick and York Inc.)

Der Panamakanal. Die Bedeutung des Kanalbaues seine Technik und Wirtschaft. By M. D. Fiegl. Pp. vii+183. (Berlin: D. Reimer.) 4 marks.

Islands of Enchantment: Many-sided Melanesia Seen through many Eyes, and Recorded by F. Coombe. Pp. xxvii+382. (London: Macmillan and Co., Ltd.) 12s. net.

Manual of Farm Animals: a Practical Guide to the Choosing, Breeding, and Keep of Horses, Cattle, Sheep, and Swine. By Prof. M. W. Harper. Pp. xxv+545. (London: Macmillan and Co., Ltd.) 8s. 6d. net.

Laughter: an Essay on the Meaning of the Comic. By Prof. H. Bergson. Authorised translation by Clouesley Brereton and F. Rothwell. Pp. vii+200. (London: Macmillan and Co., Ltd.) 3s. 6d. net.

Sir John Burdon Sanderson: a Memoir by the late Lady Burdon Sanderson, completed and edited by his Nephew and Niece, with a selection from his papers and addresses. Pp. 315. (Oxford: Clarendon Press.) 10s. 6d. net.

Die Silicate in Chemischer und Technischer Beziehung. By Drs. W. and D. Asch. Pp. xv+409. (Berlin: Springer.) 16 marks.

Cours de la Faculté des Sciences de Paris. Leçons sur les Hypothèses Cosmogoniques Professées à la Sorbonne. By H. Poincaré. Rédigées par H. Vergne. Pp. xxv+294. (Paris: Hermann.) 12 francs.

Astronomy. By A. R. Hinks. Pp. 256. (London: Williams and Norgate.) 1s. net.

Introduction to Science. By Prof. J. A. Thomson. Pp. 256. (London: Williams and Norgate.) 1s. net.

Confessions of a Robin. By Lieut.-Col. A. F. Mockler-Ferryman. Pp. 192. (London: S.P.C.K.) 2s.

Geometry for Schools. By W. G. Borchardt and the Rev. A. D. Perrott. Vol. i. Pp. viii+52 and Answers. Vol. ii. Pp. viii+53 to 162 and Answers. (London: G. Bell and Sons, Ltd.) 1s. and 1s. 6d.

The Enzyme Treatment of Cancer and its Scientific Basis. By Dr. J. Beard. Pp. xix+290. (London: Chatto and Windus.) 7s. 6d. net.

Chemistry and Chemical Magic. By V. E. Johnson. Pp. 150. (London: H. Frowde and Hodder and Stoughton.) 1s. 6d.

Mechanics and some of its Mysteries. By V. E. Johnson. Pp. 120. (London: H. Frowde and Hodder and Stoughton.) 1s. 6d.

Flying and some of its Mysteries. By V. E. Johnson. Pp. 138. (London: H. Frowde and Hodder and Stoughton.) 1s. 6d.

Modern Science Reader, with Special Reference to Chemistry. Edited by Prof. R. M. Bird. Pp. viii+323. (London: Macmillan and Co., Ltd.) 5s. net.

Lehrbuch der Protozoenkunde. By Prof. F. Doflein. Dritte stark vermehrte Auflage. Pp. xii+1043. (Jena: Fischer.) 26 marks.

Geologische Charakterbilder. Herausgegeben von Prof. H. Stille. Heft 2-8. (Berlin: Gebrüder Borntraeger.) Various prices.

The Climate of the Continent of Africa. By A. Knox. Pp. xiv+552. (Cambridge University Press.) 21s. net.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 9.

ROYAL SOCIETY, at 4.30.—The Spectrum of Boron: Sir W. Crookes, O.M. For. Sec. R.S.—A Chemically-active Modification of Nitrogen produced by the Electric Discharge. II.: Hon. R. J. Strutt, F.R.S.—Production of Solid Oxygen by the Evaporation of the Liquid: Prof. Sir J. Dewar, F.R.S.—On the Gaseous Condensable Compound, Explosive at Low Temperatures, produced from Carbon Disulphide Vapour by the Action of the Silent Electric Discharge. II.: Prof. Sir J. Dewar, F.R.S., and Dr. H. O. Jones.—(1) Optical Dispersion: a Comparison of the Maxima of Absorption and Selective Reflection for certain Substances; (2) The Influence of the Solvent on the Position of Absorption Bands in Solutions: Dr. T. H. Havelock.—An Experimental Investigation of Gibbs's Thermodynamical Theory of Interfacial Concentration in the Case of an Air-water Interface: Prof. F. G. Donnan, F.R.S., and J. T. Barker.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Modern High Voltage Power Transformers in Practice with special reference to a "T" Three Unit System: W. T. Taylor.

THE CONCRETE INSTITUTE, at 8.—Presidential Address: Sir Henry Tanner, C.B.

MATHEMATICAL SOCIETY, at 5.30.—Annual General Meeting.—The Invariants of the Linear Partial Differential Equation of the Second Order in Two Independent Variables: J. E. Campbell.—On Invariants of a Canonical Substitution: H. Hilton.—The System of Lines of a Cubic Surface: C. T. Bennett.—The Relations between Borel's and Cesaro's Methods of Summation: G. H. Hardy and J. E. Littlewood.—A Method of Establishing the 27-line Configuration of a Cubic Surface: W. P. Milne. Mathematical Analogues of Mental Phenomena: H. Bateman.

FRIDAY, NOVEMBER 10.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Nouvelles étoiles doubles, 6me série: R. Jonckheere.—Empirical Short Period Terms in the Moon's Mean Longitude: F. E. Ross.—(1) Mean Areas and Heliographic Latitudes of Sun-spots in the Year 1910; (2) Observations of Jupiter's 8th Satellite: Royal Observatory, Greenwich.—The Influence of Anomalous Dispersion on Solar Phenomena: P. V. Bevan.—Astrographic Measures of Double Stars: R. W. Wrigley.—On the Errors of Measurements on Photographic Plates: Winifred Gibson.—Fifth Note on the Number of Faint Stars with Large Proper Motions: F. A. Bellamy.—The Spectrum of Nebulium: J. W. Nicholson.—Probable Paper: Possible Phase Relations between the Planets and Sun-spot Phenomena: F. J. M. Stratton.

PHYSICAL SOCIETY (at Finsbury Technical College), at 5.—Reflecting Polariscopes for the Study of Optical Stress in Materials: Prof. Silvanus P. Thompson and Prof. E. G. Coker; The Effects of Holes and Semicircular Notches in the Distribution of Stress in Tension Members (demonstrated by polarised light): Prof. E. G. Coker.—(1) A Surface-tension Phenomenon; (2) Temperature Rise in Drops as they Part; (3) Temperatures of Equidensity of Liquids: Mr. C. R. Darling.—(1) Exhibition of a Large Harmonograph; (2) Physiological Effect of an Alternating Magnetic Field; (3) Demonstrations of Acoustical Experiments, New and Old: Prof. S. P. Thompson.

TUESDAY, NOVEMBER 14.

MINERALOGICAL SOCIETY, at 5.30.—On Crystals of Dufrenoyite, Seligmannite and Rathite: R. H. Solly.—A Simple Graphic Method for Determining Extinction-angles in Sections of Biaxial Crystals: H. G. Smith.—On the Meteoric-stone which recently fell in Egypt: Dr. G. T. Prior.—Strüverite from the Federated Malay States: T. Cook and S. T. Johnstone.—On the Temperature at which Gypsum becomes Uniaxial: A. Hutchinson.—On a Total-reflexion Diagram: A. Hutchinson.—The Occurrence of Akerite in Coal: T. Crook.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—The Mafulu Mountain People of British New Guinea: R. W. Williamson.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Loch Leven Water-power Works: A. H. Roberts.—The Hydro-electric Plant in the British Aluminium Company's Factory at Kinlochleven: F. B. Sonnenschein.

WEDNESDAY, NOVEMBER 15.

ENTOMOLOGICAL SOCIETY, at 8.—Descriptions of South American Microlepidoptera: E. Meyrick, F.R.S.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—The Abnormal Summer of 1911: C. Harding.—Notes on Solar Halos: W. Larden.

ROYAL MICROSCOPICAL SOCIETY, at 8.—A Geometric Slide Photo-micrographic Apparatus: J. E. Barnard.—British Enchytræids. II. The Genus *Fridericia*: Rev. Hilderic Friend.

THURSDAY, NOVEMBER 16.

ROYAL SOCIETY, at 4.30.—Probable Papers: On the Discovery of a Novel Type of Flint Implements below the Base of the Red Crag of Suffolk, proving the Existence of Skilled Workers of Flint in the Pliocene Age: Sir Ray Lankester, K.C.B., F.R.S.—The Influence of Ionised Air on Bacteria: Prof. W. M. Thornton.—The Permeability of the Yeast Cell: S. G. Paine.—The Intrinsic Factors in the Act of Progression in the Mammal: Dr. T. G. Brown.—Ventilation of the Lung during Chloroform Narcosis: G. A. Buckmaster and J. A. Gardner.—The Refractive Indices of the Eye Media of some Australian Animals: Dr. J. L. Jona.—Studies in Heredity. I. The Effects of Crossing the Sea-urchins, *Echinus esculentus* and *Echinocardium cordatum*.

INSTITUTION OF MINING AND METALLURGY, at 8.—Adjourned Discussions: (1) Fallacies in the Theory of the Organic Origin of Petroleum: Eugene Coste; (2) The Economics of Tube-milling: H. Standish Ball. Paper: The Whim Well Copper Mine, West Pilbara, North-west Australia: H. R. Sleeman.

FRIDAY, NOVEMBER 17.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Endurance of Metals: Experiments on Rotating Beams at University College, London: E. M. Eden, W. N. Rose, and F. L. Cunningham. (Adjourned Discussion.)—Probable Paper: Double-cutting and High-speed Planing Machines: J. Hartley Wicksteed.

ILLUMINATING ENGINEERING SOCIETY, at 8.—Notes on the Design of Motor-car Headlights: Dr. H. R. B. Hickman.

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